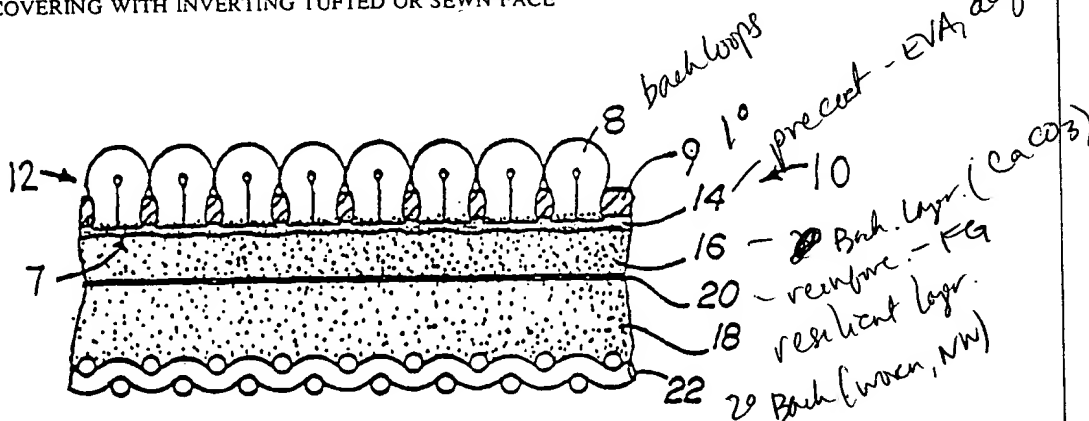




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : D06N 7/00, A47G 27/04		A2	(11) International Publication Number: WO 99/55954
			(43) International Publication Date: 4 November 1999 (04.11.99)
(21) International Application Number: PCT/US99/09011		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 26 April 1999 (26.04.99)			
(30) Priority Data: 60/083,136 27 April 1998 (27.04.98) US			
(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application US 60/083,136 (CIP) Filed on 27 April 1998 (27.04.98)			
(71) Applicant (for all designated States except US): INTERFACE, INC. [US/US]; Suite 2000, 2859 Paces Ferry Road, Atlanta, GA 30339 (US).		Published Without international search report and to be republished upon receipt of that report.	
(72) Inventors; and (75) Inventors/Applicants (for US only): OAKEY, David, D. [US/US]; 868 Tiney Woods Drive, LaGrange, GA 30240 (US). MOSS, John, Randall [US/US]; 187 Lovebridge Road, Calhoun, GA 30701 (US). JONES, Stuart [US/US]; 122 Taylor Len Drive, LaGrange, GA 30240 (US).			
(74) Agents: PRATT, John, S. et al.; Kilpatrick Stockton LLP, Suite 2800, 1100 Peachtree Street, Atlanta, GA 30309-4530 (US).			
(54) Title: FLOOR COVERING WITH INVERTING TUFTED OR SEWN FACE			



(57) Abstract

Flooring that utilizes inverted, tufted top cloth or sewn top cloth to produce flat, durable carpet that is bonded to engineered backing structures. Urethane modified bitumen may be used as a backing layer, and an optional latex precoat may be used on the top cloth layer, together with an optional antimicrobial in the precoat.

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FLOOR COVERING WITH INVERTED TUFTED OR SEWN FACE

Field of the Invention

This invention relates to floor coverings, including carpet and carpet tile and
5 resilient sheet and tile products such as vinyl flooring.

Background of the Invention

Myriad materials have been used for flooring and floor coverings in
buildings, including virtually every natural and human-made material imaginable,
such as wood, stone, concrete, cork, plastics, paint, carpets, rugs, vinyl sheets and
10 tiles, sawdust, rushes, and animal skins, to name just a few. Rugs and carpets in a
wide variety of materials, patterns and constructions have been manufactured for
centuries, particularly for use in homes. As recently as the middle of the twentieth
century, carpets and rugs were virtually never used in commercial and industrial
buildings like manufacturing facilities, stores and offices. Floors in such locations
15 utilized "hard surface" materials like concrete, concrete compositions, wood or
sheet materials like linoleum. Beginning in approximately the late 1960's and
1970's, carpet and carpet tiles began to be used extensively in commercial and
"light" industrial buildings, a trend that was accelerated by the advent of new carpet
technologies that provided more durable and attractive products and by the
20 popularity of "open" floor plan offices.

As a result of these developments, the comfort and aesthetic appeal of carpet
and carpet tile have come to be widely expected in offices and other commercial
environments.

Carpet and rug products have unquestionably provided substantial aesthetic
25 benefits in commercial settings. They nevertheless have drawbacks. They are high
maintenance products that are easily soiled, difficult to clean and slow to dry when
cleaned with water or other solvents. Carpet and rug products wear fairly rapidly,
requiring frequent replacement. Such products are easily marked by furniture and
other concentrated loads and typically do not easily accommodate wheeled traffic
30 like carts and furniture with caster wheels. Carpet and rug products are also

expensive, in part because of the substantial quantity of fiber they employ to provide a pile surface.

Many of these considerations have motivated reassessment of "hard" surface floor materials. Users of commercial buildings have learned, however, to appreciate and desire the beauty, color range and design versatility of textile fiber flooring products like carpet, carpet tile and rugs. The capabilities of modern carpet production equipment have contributed substantially not only to the myriad design possibilities available for textile fiber flooring products. Such equipment has also made it highly practical economically to manufacture relatively small quantities of sophisticated designs, because design changes can be made by relatively straightforward computer programming changes.

Despite the enormous variety of prior carpet and rug structures, none exhibit all of the desirable qualities of durability, service and design flexibility to the same degree.

Among other constructions, carpet and rug products have been manufactured with an upper surface or face utilizing hand knotting techniques, tufting, carpet weaving (*e. g.*, Axminster, Chenille, Velvet and Wilton weaving), and fusion bonding. As a general proposition, higher quality carpet and rug structures have utilized thicker or heavier face layers containing yarns that are longer and/or more densely packed, thereby contributing to heavy "face weights." Such heavy face weight carpet and rug structures provide desirable feelings of "depth" and good wear characteristics. However, heavy face weight carpets and rugs are expensive, are typically easily crushed by concentrated loads, utilize substantial quantities of yarn, and are time consuming and somewhat difficult to produce. Particularly difficult to produce are some sophisticated patterns utilizing different color yarns.

Furthermore, historically, virtually all prior carpet and rug products have been manufactured with concern principally for cost, aesthetics and performance, and with little or no concern for the resources required to provide such components or the destination or reuse of the components after the product is removed from service.

Notwithstanding the long history of carpet and rug production and variety of other existing flooring alternatives, there remains a need for flooring material that exhibits some of the characteristics of carpet and carpet tile, like design versatility, but that shares other characteristics of entirely different floorings. As compared, in particular, to conventional carpet, there is likewise a growing need for flooring structures that minimize the quantity of materials (and therefore natural resources) needed.

To summarize, there exists a need for flooring material that:

- is easily and quickly cleaned
- requires low maintenance
- is durable
- easily accommodates wheeled traffic
- is economical to produce
- is sufficiently hard to resist rapid and extensive deformation by concentrated loads such as those exerted by desk legs and other heavy furniture
- is very attractive
- accommodates wide-ranging and colorful design.

One of the largest segments of the commercial carpet market is supplied with tufted carpet products. In the manufacture of tufted carpet "top cloth," tufts of carpet yarn are pushed through a "primary" backing fabric so that loops of yarn project a very small distance below the primary backing fabric and yarn loops or cut pile that form the visible face of the carpet projects above the primary backing fabric. A backing is typically bonded with adhesive or otherwise to the underside of the primary backing fabric and the loops that project through it.

Summary of the Invention

The methods and structures of the present invention provide high quality, durable, attractive flooring by utilizing relatively conventional carpet tufting equipment to tuft yarn into a tufting primary backing fabric, leaving very little yarn "above" the primary backing fabric on the side that is normally the exposed face of

the carpet. If necessary, in order to achieve a flat surface on the side from which the tufts are inserted, or to save recyclable yarn fiber, the surface can even be shaved or sheared after tufting. A secondary backing is then bonded to this "face" side of the tufted "top cloth," and the product is turned over for use so that the visible, exposed top surface of the flooring product is provided by the loops that project through the primary backing fabric to what would normally be the bottom of the primary backing fabric.

These exposed, very low profile loops form an attractive appearance that can vary in color and design as widely as the variations available in the design of conventional tufted carpet. By comparison to tufted carpet, however, dramatically lower yarn weights are possible, with dramatic cost savings and lower demand on natural resources. The low quantity of yarn and tight, low loops also provide desirable wear characteristics and facilitate maintenance and cleaning.

In an alternative flooring structure having similarly desirable properties, carpet yarn may be sewn into a primary backing fabric using conventional sewing techniques with yarns on both top and bottom of the primary fabric. Moreover, dissimilar yarns on the top and bottom of the primary backing fabric can be used, or yarn on one side and a smaller thread or monofilament on the other side of the primary backing fabric can be used.

After the "top cloth" is prepared by the tufting or sewing techniques described above, a backing structure is bonded to the top cloth using any of a variety of materials and techniques. A wide variety of backing systems may be used depending on the properties desired, including the desired underfoot "feel." For instance, essential solid backing materials can be used, or foam layers can be included to provide flooring that feels "soft" or "hard" underfoot as desired. A latex precoat can be applied to the surface of the top cloth that will be on the underside in use, and then additional layers of polymeric and other materials may be added. Such layers in the backing system can include polyvinyl chloride resin systems or latex foams, including various fillers, and stabilizing and reinforcing layers of fiberglass and other materials. Among other usable backing systems are those

employing bitumen modified to possess thermosetting properties, such as bitumens including a thermosetting amount of, e.g., a hydroxyl-terminated polybutadienepolyisocyanate urethane polymer. The thus backed flooring can be used as conventionally installed roll goods or cut into modules or tiles and then installed in essentially the same manner as free-lay or glued down carpet tiles are installed.

Use of such an inverted, tufted top layer, or a sewn face layer, in flooring and flooring tile permits production of flooring having sophisticated multi-color designs, conserves natural resources used for forming fiber, permits production of new flooring designs quickly and, if desired, in small production quantities, and provides flooring and flooring tile that is extremely attractive, relatively inexpensive, and easy to clean, maintain and recycle. Moreover, the face layer of the flooring of the present invention exhibits more "give" and is therefore more comfortable under foot than conventional "hard" surface flooring materials, but at the same time presents a less deformable surface than a typical carpet structure with tall upstanding yarn ends or loops. Desired deformation characteristics and "feel" under foot may be achieved utilizing foam, composite, and other backing structures together with various yarn and weave combinations.

20 **Brief Description of the Drawings**

Fig. 1 is a schematized elevation view of the tufted top cloth component of the flooring of our invention.

Fig. 2 is a schematized view of the top cloth component of our invention shown in Fig. 1, after unneeded yarn is sheared to leave a uniform surface to which
25 backing will be attached.

Fig. 3 is an elevation view of the flooring of our invention shown with the backing attached.

Fig. 4 is a schematic side elevation view illustrating one method of production of the flooring illustrated in Fig. 3.

Detailed Description of the Drawings

Figs. 1, 2, 3, and 4 illustrate, in schematized form, the principal steps in the preparation of the tufted version of the flooring 10 of the present invention.

I. Top Cloth

5 As is illustrated in Fig. 1, yarn 2 is tufted into a first backing fabric 9 in a substantially conventional manner. As is illustrated in Fig. 1, the tufts may be left in loop form 4 or cut as illustrated in 6. In any event, yarn loop size and height is exaggerated in the figures for clarity and tufts shorter than those illustrated in the figures will typically be desirable in order to save yarn. In one embodiment the
10 yarn used is a nylon yarn, but alternative yarns such as polyester, polypropylene, wool and a variety of other yarns could be used.

Fig. 2 illustrates the same structures as Fig. 1 except that the tufts have been sheared off to leave sheared tufts 8 in order to save yarn 2 fiber (which can be recycled) and to leave a uniform surface for the attachment of backing to the tufted
15 top cloth 12. The tufted top cloth 12 has a face side 7 and a bottom side 5.

Alternatively, the top cloth may be produced by sewing carpet yarn into a backing using conventional sewing techniques. This alternative sewn top cloth has similarly desirable properties to the tufted top cloth described above.

II. Top Cloth With Backing

20 Fig. 3 is a side elevation, schematic view of one embodiment of roll goods or modular flooring 10 constructed in accordance with this invention. Flooring 10 has a top layer of top cloth 12 according to the invention that includes sheared tufts 8 and backing fabric 9. The top cloth 12 could also be the alternative sewn top cloth described above. A precoat 14 is applied to the face side 7 of top cloth 12. Bonded
25 to precoat 14 and the face side 7 of the top cloth 12 is a backing layer 16. A resilient layer 18 lies under backing layer 16, and a web of reinforcement material 20 is positioned between backing layer 16 and resilient layer 18. Finally, the bottom-most layer is a second backing fabric 22.

A. Precoat

Precoat 14 may serve several functions. Precoat 14 may bond yarns within top cloth 12 to each other, thereby stabilizing top cloth 12 and assisting in preventing edge ravel; it may provide a material to which the material of backing layer 16 bonds more readily than it bonds to top cloth 12, and it may serve as a carrier for flame retardant materials or as a carrier and reservoir for antimicrobial or other materials that are intended to migrate into and through top cloth 12.

Although precoat 14 may serve as an adhesive to bond top cloth 12 to backing layer 16, it may be desirable for the bond to be sufficiently weak that top cloth 12 can be stripped off of backing layer 16 in order to recycle the components of flooring 10.

Precoat 14 may be a highly frothed ethylene vinyl acetate or acrylic latex to which is added an antimicrobial such as Intersept® antimicrobial, which is available from Interface Research Corporation, Kennesaw, Georgia and is included at a concentration of approximately slightly less than 7% by weight of the weight of the face yarn fibers of the flooring 10. As an example of the frothing, the mixture may be frothed with a blow ratio of 2.8, which means that the cup weight of the unfrothed mixture is 2.8 times that of the frothed mixture. Precoat 14 may be applied in a very thin layer from which the water evaporates quickly, leaving a layer weighing on the order of approximately 1.8 - 3.5 ounces of precoat (dry weight) per square yard of flooring 10, and preferably approximately 1.8 ounces per square yard. The following Example 2 sets forth a usable precoat formulation.

Example 2 – Precoat

<u>Parts per hundred resin (phr)</u>	<u>Component</u>
55	E-190 base latex from National Starch ¹
55	water
1	sage (natural foaming agent)
2.2	Para-Chem 277 thickener ²
1.5	Intersept® Antimicrobial ³
2.2	Eagleban SP-120 (phosphorus/bromine dispersion flame retardant) ⁴

¹ National Starch and Chemical Company, 195 Ottley Drive, N.E., Atlanta, GA 30324.

² Para-Chem, Hwy 14 / PO Box 127, Simpsonville, South Carolina 29681.

³ Interface Inc., 2589 Paces Ferry Rd., Atlanta, GA 30339. Intersept is a phosphorus/amine containing antimicrobial composition

⁴ Eagle Systems Corporation, P.O. Box 888018, Atlanta, GA 30356

Precoat 14 is direct coated onto top cloth 12 with an overdriven, weighted roll with a roll to web ratio of 1.3 (meaning that the roll surface speed is 1.3 times the surface speed of the web in contact with the roll).

5 **B. Fabric Stabilizing Layer**

If desired, a fabric 12 stabilizing layer (not shown in Fig. 1) of fiberglass (such as DURA-GLASS® 7613 non-woven fiberglass fleece sold by Schuller Mats & Reinforcements, P. O. Box 517, Toledo, Ohio 43687-0517) may be bonded to the tufted side 7 of top cloth 12 with precoat 14 or an alternative adhesive material.

10 **C. Backing Layer**

Backing layer 16 may be a wide variety of materials, depending on the properties desired. For instance, it may be any of a wide variety of solid, semi-solid, resilient, and foamed plastic and thermoplastic materials, including natural and synthetic rubber, polyvinyl chloride, polyurethane, atactic polypropylene and
15 hot melts, such as low density to high density EVA hot melts, polyethylene and others.

As an alternative to these and other conventional backing materials, backing layer 16 may be a urethane-modified bitumen composition chemically similar to the bitumen including a thermosetting amount of, e.g., a hydroxyl-terminated
20 polybutadienepolyisocyanate urethane polymer disclosed for use as an adhesive in U. S. Patent No. 5,096,764 to Terry *et al.*, which is incorporated herein in its entirety by reference. While backing layer 16 has adhesive properties in this application, it is utilized not merely as an adhesive but to provide desired weight and other physical properties. Among the properties provided by this urethane-
25 modified bitumen composition, are that it is pliable, can be stretched and has some memory.

Backing layer 16 may be any desired thickness, depending on the service and other requirements of flooring 10. It should typically range in thickness between approximately 30 and 60 mils, should preferably be between 30 and 40 mils, and
30 most preferably should be approximately 32 mils thick. The weight of backing

layer 16 will also vary widely depending on the material chosen and service requirements. Typical weights of backing layer 16, if modified bitumen as described below is used, will range between approximately 10 and 60 ounces per square yard. A preferred weight is approximately 32 ounces per square yard.

- 5 A usable composition of modified bitumen for layer 14 is described in the following Example 3, which provides the amounts and identity of starting materials combined and reacted to form the urethane-modified bitumen used in the backing of the present invention.

Example 3 -- Backing Layer

<u>Component</u>	<u>Preferred number of parts per hundred bitumen</u>	<u>Range in wt% based on final composition</u>
Propane D Asphalt (Shell bitumen)	100	25 - 40, more particularly 27 - 33
Calcium Carbonate	175	45 - 65, more particularly, 55 - 65
R45HT Poly BD (Atochem polybutadiene polyol)	31.95	3 - 20, more particularly 4 - 16
143L (Dow Chemical Co. diphenylmethane diisocyanate)	4.8	0.4 - 3.5, more particularly 0.6 - 2.4

The components may vary by as much as ± 10 pph. The amount of isocyanate added is generally proportional to the amount of polyol used, generally around 15%. The formulation set forth above can be modified by adding a catalyst for the reaction between the polyol and the polyisocyanate, and/or by substituting
5 aluminum trihydrate (ATH) for calcium carbonate up to approximately twenty-five percent (25%) of the calcium carbonate. For instance, a backing layer formed by reacting 100 parts Shell Propane D Asphalt, about 43.75 parts aluminum trihydrate, 131.25 parts calcium carbonate, 32.01 parts R45HT Poly BD, and 4.785 parts Iso 265 diisocyanate would be suitable for use as a backing in the present invention.

10 **D. Reinforcement Web**

Reinforcement web 20 stiffens and stabilizes flooring 10 and may be a number of different materials such as fiberglass, ceramic fibers, polyester, a PET/polyester blend or a PET/nylon blend. Among these alternatives, a preferred material for web 20 is non-woven fiberglass fleece, such as Schuller 7613 fiberglass
15 fleece weighing approximately 1.3 ounces per square yard.

E. Resilient Layer

Like backing layer 16, resilient layer 18 may also be a wide variety of materials, depending on the properties desired. For instance, it may be any of a wide variety of solid, semi-solid, resilient, and foamed plastic and thermoplastic
20 materials, including natural and synthetic rubber, polyvinyl chloride, polyurethane, atactic polypropylene and the modified bitumen described above. Resilient layer 18 may also have a variety of different densities, weights and thicknesses, depending on the properties desired. A preferred material for resilient layer 18 is polyurethane foam on the order, for instance of approximately 125 mils in
25 thickness. A usable urethane foam formulation is set forth in the following Example 4. (Textile Rubber & Chemical Company is located at 1300 Tiarco Drive, Dalton, Georgia.)

Example 4 – Resilient Layer

<u>Component</u>	<u>Parts</u>
Textile Rubber and Chemical Co. FP-C433 polyol	6.05
Textile Rubber and Chemical Co. C-344 KD isocyanate	1

F. Second Backing Fabric

The second backing fabric 22 may be selected from a wide variety of conventional synthetic and natural backing materials, including various woven and non-woven fabrics. A preferred material for second backing fabric 22 is ActionBac® 3872 woven polypropylene carpet backing available from Amoco Corporation.

III. Flooring Production

Fig. 4 is a schematic side elevation view illustrating one method of production of flooring 10. Beginning at the left side of Fig. 4, second backing fabric 22 unrolls from a roll 24 and passes under a doctor blade 26 or other metering device that meters a desired thickness of urethane foam 28 or other material onto the second backing fabric 22 to form a resilient layer 18 on top of second backing fabric 22. Heat, indicated by arrows 30, may be applied to the underside of the advancing web of the second backing fabric 22 and resilient layer 18 to accelerate curing of resilient layer 18. A web of reinforcement 20 is unrolled from roll 32 and passes around a roller 34 which presses the reinforcement web 20 into contact with the upper surface of resilient layer 18 so that it will be bonded to resilient layer 18. As

is indicated by arrow 36, roll 34 may be positioned as desired nearer or further from doctor blade 26, so that reinforcement web 20 may be married to resilient layer 18 in a position selected by reference to the stage of curing of resilient layer 18 that has been achieved.

5 The advancing composite web of the second backing fabric 22, resilient layer 18 and reinforcement web 20 then passes under a liquid puddle 38 and a doctor blade 40 or other appropriate metering device to apply a uniform backing layer 16 of urethane modified bitumen or other material that then passes under a press roller 42 together with reinforcement web 20, resilient layer 18 and second backing fabric
10 22.

 Meanwhile or earlier, top cloth 12 unrolls from a roll 44 of inverted tufted fabric 12, as described above, and passes under a puddle 46 of precoat 14 that is metered by metering roll 48 to deposit a thin layer of precoat 14 on face side 7 of top cloth 12, which then passes around turn roller 50 and press roller 42. Press
15 roller 42 presses precoat 14 and tufted side 7 of top cloth 12 against the top of backing layer 16 to form flooring 10.

 After completion of construction of the flooring 10 of the present invention it is placed on a suitable subfloor or other structure for use in roll goods form, or it may be cut into modules similar, for instance, in size to carpet tile modules and the
20 modules may then be placed side-by-side on a suitable subfloor or other structure to provide a continuous flooring surface.

 The foregoing is provided for purposes of explanation and disclosure of preferred embodiments of the present invention. Modifications and adaptations to the desired embodiments will be apparent to those skilled in the art and may be
25 made without departing from the scope or spirit of the invention and the following claims.

We claim:

- 1 1. Floor covering, comprising:
2 a top layer formed by tufting yarn into a first backing fabric, the top layer
3 having a face side and a bottom side,
4 a backing layer positioned below the top layer so that the face side of the top
5 layer faces the backing layer, and
6 a second backing fabric below the backing layer.

- 1 2. The floor covering of claim 1, further comprising a reinforcement
2 web under the backing layer.

- 1 3. The floor covering of claim 1, further comprising a precoat layer
2 between the face side of the top layer and the backing layer.

- 1 4. The floor covering of claim 3, in which the precoat comprises highly
2 frothed ethylene vinyl acetate or acrylic latex.

- 1 5. The floor covering of claim 4, wherein the precoat is formed by
2 applying a highly frothed ethylene vinyl acetate or acrylic latex to the face side of
3 the top layer.

- 1 6. The floor covering of claim 5, in which the precoat further comprises
2 an antimicrobial.

- 1 7. The floor covering of claim 6, in which the antimicrobial comprises a
2 phosphorus amine antimicrobial.

1 8. The floor covering of claim 3, in which the precoat comprises a base
2 latex, water, a foaming agent, thickener and flame retardant.

1 9. The floor covering of claim 3, in which the precoat further comprises
2 an antimicrobial.

1 10. The floor covering of claim 1, further comprising a fabric stabilizing
2 layer adjacent to the face side of the top layer.

1 11. The floor covering of claim 10, in which the fabric stabilizing layer
2 comprises a web of non-woven fiberglass fleece.

1 12. The floor covering of claim 1, in which the second backing fabric
2 comprises woven polypropylene carpet backing.

1 13. The floor covering of claim 1, further comprising a resilient layer
2 positioned between the top layer and the backing layer.

1 14. The floor covering of claim 13, in which the backing layer is
2 urethane-modified bitumen.

1 15. The floor covering of claim 14, in which the backing layer weighs
2 between approximately 10 and 60 ounces per square yard.

1 16. The floor covering of claim 2, further comprising a resilient layer
2 between the backing layer and the second backing fabric.

1 17. The floor covering of claim 16, in which the resilient layer comprises
2 polyurethane foam.

1 18. The floor covering of claim 2, in which the reinforcement web
2 comprises non-woven fiberglass fleece.

1 19. The floor covering of claim 18, in which the fiberglass fleece weighs
2 approximately 1.3 ounces per square yard.

1 20. The floor covering of claim 1, wherein the floor covering is cut into
2 carpet tiles.

1 21. The floor covering of claim 1, wherein the floor covering is utilized
2 as roll goods.

1 22. Floor covering comprising:
2 (a) a top layer formed by tufting yarn in a first backing fabric, the
3 top layer having a face side and a bottom side,
4 (b) a layer of urethane modified bitumen below the top layer so
5 that the face side of the top layer faces the layer of urethane modified bitumen,
6 (c) a layer of polyurethane foam below the layer of urethane-
7 modified bitumen,
8 (d) a fiberglass fleece web positioned generally between the
9 urethane modified bitumen and the polyurethane foam, and
10 (e) a web of woven polypropylene carpet backing below the
11 polyurethane foam.

1 23. The floor covering of claim 22, further comprising a latex precoat
2 containing an antimicrobial on the face side of the top layer.

1 24. A method for producing floor covering, comprising:
2 (a) making a tufted top layer by tufting yarns in a first backing fabric,
3 the top layer having a face side and a bottom side,
4 (b) forming a layer of resilient material,
5 (c) bonding the resilient layer to a web of backing fabric,
6 (d) forming a backing layer,
7 (e) positioning a reinforcement web between the backing layer and
8 the resilient layer,
9 (f) bonding the backing layer and resilient layer together with the
10 reinforcement web between the backing and resilient layers, and
11 (g) bonding the backing layer to the face side of the top layer.

1 25. The method for producing floor covering of claim 24, in which the
2 resilient material comprises polyurethane foam.

1 26. The method for producing floor covering of claim 24, in which the
2 second backing fabric comprises woven polypropylene.

1 27. The method for producing floor covering of claim 24, in which the
2 backing layer comprises urethane modified bitumen.

1 28. The method for producing floor covering of claim 24, in which the
2 reinforcement web comprises nonwoven fiberglass fleece.

1 29. The method for producing floor covering of claim 24, further
2 comprising applying a precoat to the face side of the top layer before bonding the
3 top layer to the backing layer.

1 30. The method for producing floor covering of claim 29, further
2 comprising incorporating an antimicrobial in the precoat.

1 31. The method for producing floor covering of claim 24, further
2 comprising cutting the floor covering into carpet tiles.

1 32. The method for producing floor covering of claim 24, further
2 comprising utilizing the floor covering as roll goods.

1 33. A method for providing a continuous floor covering, comprising:
2 (a) providing a plurality of carpet tiles, the carpet tiles comprising an
3 inverted, tufted top layer, a bottom layer of woven polypropylene carpet backing,
4 and at least one layer between the inverted, tufted top layer and the woven
5 polypropylene carpet backing
6 (b) applying adhesive to one or both of the floor or the underside of
7 each carpet tile,
8 (c) positioning on the floor the plurality of carpet tiles completely
9 covering the floor area to be covered, and
10 (d) with the plurality of carpet tiles positioned on the floor with edges
11 positioned in abutting relationship, permitting the adhesive to cure.

1 34. Floor covering, comprising:
2 a top layer formed by sewing carpet yarn in a first backing fabric,
3 a backing layer positioned below the top layer, and
4 a second backing fabric below the backing layer.

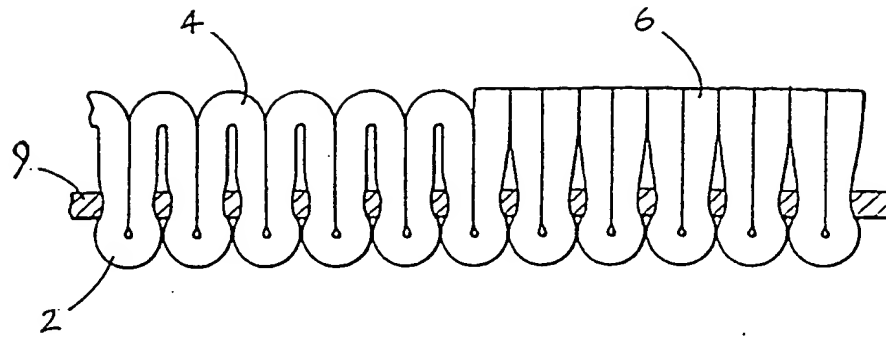


FIG 1

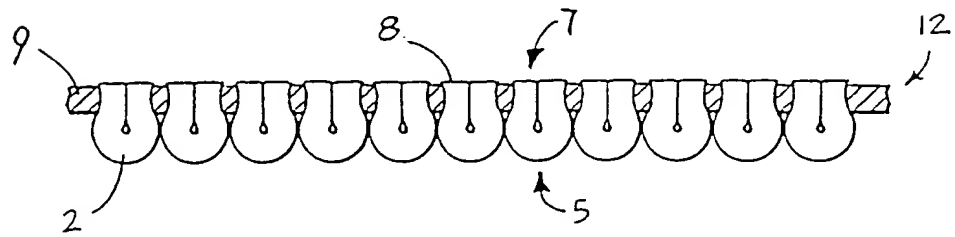


FIG 2

